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CENTRAL INTELLIGENCE AGENCY
WASHINGTON, D.C. 20505

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10 May 1974

MEMORANDUM FOR: Mr. S. Youssef
Office of Economic Research
US Tariff Commission

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SUBJECT : CIA Trade-Weighted Exchange Rates: Methodology and Results

1. The attachments to this memorandum are in response to your request of 7 May 1974 for information concerning the CIA trade-weighted exchange rate index.

2. Attachment 1 describes the method used in calculating the CIA index published in the Economic Intelligence Weekly. It also discusses the rationale for limiting the country sample to seventeen industrialized nations.

3. Attachment 2 indicates what the change in the trade-weighted value of the dollar was relative to four base periods. The series covers the period 4 May 1973 to 3 May 1974.

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4. [redacted] will be pleased to answer any further questions you may have on this topic.

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Attachments:
As stated

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Calculation of the CIA Trade-Weighted Exchange Rate Indexes

Methodology

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The CIA trade-weighted exchange rate indexes included in the Economic Intelligence Weekly measure the variation in exchange rates for each of seven major industrial countries[1] relative to their trade partners. The rates are calculated by taking the percentage change, for various base periods, in each country's currency relative to the currencies of its trade partners included in the exercise using the dollar as the value numeraire. (See the next section for a description of the country sample.) The percentage changes are combined using the percentage of each country's total trade with countries included in the exercise as weights.

As an example of how the calculations are performed consider the trade-weighted exchange rate index for the United States.

- The percentage change in the value of the dollar in terms of the yen when the yen rate appreciated from, say, 360 yen per dollar to 308 yen per dollar was taken as,

$$\text{Percentage change in value of dollar in terms of yen} = \frac{¥_2/\$_2 - ¥_1/\$_1}{¥_1/\$_1}$$

[1] United States, Canada, Japan, France, West Germany, Italy, and the United Kingdom.

$$= \frac{308 - 360}{360} = -14.44$$

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This is the appropriate measure of the dollar's devaluation when assessing the impact of the exchange rate change on US exports to Japan, since it measures the change in the dollar's price in the eyes of Japanese importers.

- The percentage change in the value of the yen in terms of the dollar was taken as,

$$\text{percentage change in value of yen in terms of dollars} = \frac{\$/¥_2 - \$/¥_1}{\$/¥_1}$$

$$= \frac{.003247 - .002778}{.002778} = +16.8$$

This is the appropriate measure of the yen's appreciation when assessing the impact of the exchange rate change on US imports from Japan since it measures the change in the yen's price in the eyes of US purchasers.

- To calculate the yen/dollar component of the trade-weighted exchange rate index for the United States, the two unweighted measures computed above are weighted by US exports to, and US imports from, Japan in 1971, respectively, as a percentage of total US trade (exports plus imports) in 1971 with the countries included in the exercise (the country sample).

- The final trade-weighted exchange rate index for the United States is the simple sum of the calculated rates after an analagous procedure is used to calculate the change in the exchange rate between the dollar and each of the currencies of the other countries included in the exercise.

If there were only three countries included in the exercise, say the United States, Japan, and West Germany, then the trade-weighted exchange rate index for the United States would be calculated as follows:

US imports from Japan = 30% of total US trade with Japan and Germany. The relevant change in the yen/dollar rate is +16.88.

US exports to Japan = 25% of total US trade with the same two countries. The relevant change in the dollar/yen rate is -14.44.

US imports from Germany = 20% of total US trade with Japan and Germany. The relevant change in the mark/dollar rate is +11.00.

US exports to Germany = 25% of total US trade with Japan and Germany. The relevant change in the dollar/mark rate is -9.00.

The numerical expression would therefore be:

$(-.30) \times (+16.88) + (.25) \times (-14.44) + (-.20) \times (+11.00) + (.25) \times (-9.00) = -13.12\%$ (i.e., the dollar has depreciated 13.12% relative to the currencies of Japan and West Germany.)

The trade-weighted exchange rate indexes for the other countries for which results are presented in the Economic Intelligence Weekly are calculated in an analagous manner. The cross rates between currencies other than the dollar computed on the basis of dollar exchange rates are used in these calculations. For example, if one dollar equalled 360 yen, or 3.02 marks then,

$$1 \text{ yen} = \frac{3.02}{360} = .0083 \text{ marks}$$

The Country Sample

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Seventeen countries are now included in the country sample used in calculating the CIA trade-weighted exchange rate indexes that appear in the Economic Intelligence Weekly. They are: the United States, Canada, Japan, France, West Germany, Italy, United Kingdom, Austria, Belgium, Denmark, the Netherlands, Norway, Spain, Sweden, Switzerland, Australia, and South Africa. The countries included in the country sample account for about 67% of total US trade and about three quarters of the total trade of most of the other countries included in the exercise (see Table 5).

A large number of countries, predominately less developed, have been excluded from the country sample in order to increase the accuracy and timeliness of the included data and to improve the indexes as measures of trends in competitiveness. In the case of the United States, inclusion of the LDC's would artificially reduce the calculated change in the US trade-weighted exchange rate index since many LDC's maintained their currency values with the dollar. The United States and the LDC's are generally not competitors in international trade, and devaluation by the LDC's consequently did not offset the impact of the dollar's devaluation on US exports. Similarly, the level of imports into most LDC's is related more to import policies and foreign exchange availability than it is to the exchange rate between the LDC and the industrial countries. The principal way in which exchange rate movements do affect US-LDC trade is in terms of their impact on US competitiveness with other industrial nations in LDC markets. This change in competitiveness, however, is unrelated to the exchange rates of the LDCs, and is captured by the existing CIA trade-weighted exchange rate index.

The justification for excluding the LDC's tends to be weaker when applied to the more advanced LDC's, such as Mexico and Taiwan, which produce some goods which do compete on the basis of price both in the home and foreign markets. It would be practically impossible, however, to eliminate this bias without incorrectly including products and countries for which exchange rates are not important determinants of trade. We believe that the overall result is more reasonable, therefore, if the LDCs are excluded altogether.

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Table 1

Percentage of Total Trade With Countries Included in Country Sample, 1971

United States	67.2	Denmark	81.3
Canada	90.1	Netherlands	81.7
Japan	51.9	Norway	82.5
France	73.6	Spain	68.5
West Germany	77.2	Sweden	74.2
Italy	69.8	Switzerland	82.4
United Kingdom	58.9	Australia	72.0
Austria	89.3	South Africa	59.0
Belgium	90.5		

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8 May 1974

Attachment 2 UNCLASSIFIED

Change in Trade-Weighted Value of the Dollar Since:

	Dec 1966 (%)	18 Dec 71 (%)	19 March 73 (%)	2 Jan 73 (%)
May 04 1973	-15.57	-6.22	.45	-6.11
May 11 1973	-15.72	-6.37	.30	-6.26
May 18 1973	-16.39	-7.01	-.33	-6.90
May 25 1973	-16.66	-7.28	-.61	-7.17
Jun 01 1973	-17.61	-8.20	-1.52	-8.09
Jun 08 1973	-17.87	-8.44	-1.75	-8.33
Jun 15 1973	-18.10	-8.65	-1.95	-8.53
Jun 22 1973	-18.52	-9.06	-2.36	-8.95
Jun 29 1973	-19.68	-10.16	-3.44	-10.04
Jul 06 1973	-21.73	-12.08	-5.30	-11.96
Jul 13 1973	-19.84	-10.29	-3.56	-10.18
Jul 20 1973	-20.57	-10.98	-4.23	-10.87
Jul 27 1973	-20.39	-10.80	-4.04	-10.68
Aug 03 1973	-19.79	-10.24	-3.51	-10.13
Aug 10 1973	-19.04	-9.51	-2.79	-9.40
Aug 17 1973	-18.16	-8.67	-1.96	-8.55
Aug 24 1973	-18.41	-8.92	-2.20	-8.80
Aug 31 1973	-18.40	-8.91	-2.19	-8.79
Sep 07 1973	-18.52	-9.01	-2.29	-8.89
Sep 14 1973	-18.42	-8.92	-2.21	-8.80
Sep 21 1973	-18.97	-9.45	-2.74	-9.34
Sep 28 1973	-18.99	-9.48	-2.77	-9.36
Oct 05 1973	-18.90	-9.39	-2.69	-9.28
Oct 12 1973	-19.21	-9.70	-2.99	-9.58
Oct 19 1973	-19.49	-9.98	-3.27	-9.86
Oct 26 1973	-19.47	-9.96	-3.26	-9.85
Nov 02 1973	-18.40	-8.95	-2.28	-8.84
Nov 09 1973	-17.02	-7.63	-.98	-7.52
Nov 16 1973	-16.41	-7.05	-.42	-6.95
Nov 23 1973	-15.47	-6.14	.49	-6.03
Nov 30 1973	-15.56	-6.22	.41	-6.12

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Change in Trade-Weighted Value of the Dollar Since

	Dec 1966 (%)	18 Dec 71 (%)	19 March 73 (%)	2 Jan 73 (%)
Dec 07 1973	-15.19	-5.85	.78	-5.75
Dec 14 1973	-15.01	-5.68	.94	-5.58
Dec 21 1973	-14.89	-5.57	1.05	-5.47
Dec 28 1973	-14.73	-5.42	1.20	-5.32
Jan 04 1974	-13.88	-4.60	2.02	-4.50
Jan 11 1974	-12.18	-2.98	3.58	-2.89
Jan 18 1974	-11.43	-2.25	4.31	-2.16
Jan 25 1974	-11.17	-1.99	4.58	-1.90
Feb 01 1974	-12.66	-3.44	3.14	-3.34
Feb 08 1974	-12.76	-3.53	3.04	-3.44
Feb 15 1974	-13.79	-4.54	2.05	-4.44
Feb 22 1974	-15.49	-6.16	.46	-6.06
Mar 01 1974	-14.56	-5.28	1.31	-5.19
Mar 08 1974	-15.09	-5.78	.83	-5.68
Mar 15 1974	-15.52	-6.19	.44	-6.08
Mar 22 1974	-16.81	-7.42	-.77	-7.31
Mar 29 1974	-17.34	-7.92	-1.26	-7.81
Apr 05 1974	-16.92	-7.53	-.88	-7.42
Apr 12 1974	-16.73	-7.33	-.68	-7.23
Apr 19 1974	-17.34	-7.93	-1.27	-7.82
Apr 26 1974	-17.82	-8.39	-1.74	-8.29
May 03 1974	-18.00	-8.56	-1.91	-8.46

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8 May 1974